

ABSTRACT

MUTANT FATTY ACID DESATURASE  
AND METHODS FOR DIRECTED MUTAGENESIS

The present invention relates to methods for producing fatty acid desaturase mutants having a substantially increased activity towards substrates with fewer than 18 carbon atom chains relative to an unmutagenized precursor desaturase having an 18 carbon chain length specificity and  
10 to the fatty acid desaturases that are produced by the methods. The present invention further relates to a method for altering a function of a protein, including a fatty acid desaturase, through directed mutagenesis involving identifying candidate amino acid residues, producing a library of mutants of the protein by simultaneously randomizing the amino acid at each candidate position, and selecting for mutants which exhibit the desired alteration of function. Candidate residues are identified by a combination of methods including random mutagenesis,  
20 structural analysis of the protein, and sequence analysis of the protein. Enzymatic, binding, structural and other functions of proteins can be altered by the method.